

pattern entity 425. Total demand time pattern entity can include a data set ID to associate the demand time pattern with the appropriate data set, a total demand ID to associate the total demand time pattern with the appropriate total demand and a pattern type to classify the total demand time pattern.

[0049] Time patterns can be important to revenue management because different types of demands have different arrival patterns. Returning to the example of the airline industry, leisure travelers tend to book flights early and pay less, while business travelers are willing to pay more for the same seat at the last minute. The total demand time pattern entity 425 can represent this time dependence for demands.

[0050] In order to help develop a total demand time pattern, the number of demands relative to a service date can be tracked and the total demand time pattern can be extrapolated therefrom. The total demand time pattern for an airline could, for example, be extrapolated from data on the number bookings five days out, four days out, three days out and so on. Total demand time pattern value entity 430 can be used to represent this type of data. Total demand time pattern value entity 430 can include a data set ID to associate the total demand time pattern value with the appropriate data set, a total demand ID to associate the total demand time pattern value with the appropriate total demand, the pattern type to classify the total demand time pattern, the time value to index the demands relative to a service date, and a value to quantify the number of requests relative to the service date.

[0051] Incidentally, in FIGURE 4, a circle such as circle 431 indicates that an entity need not exist. For example, in entity relationship diagram 400, circle 431 indicates that total demand function entity 415 need not exist for total demand entity 410 to exist. A triangle or crowfoot, such as triangle 432, indicates that many entities may exist if a parent entity exists. In the case of entity relationship diagram 400, triangle 432 could indicate that for each total demand entity 410, many total demand function entities, such as total demand entity 415, could exist. Thus, none to many total demand functions can exist for each total demand. A dash, such as dash 433, indicates that at least one such entity should exist if the dependent entities exist. For example, if there is at least one total demand function entity 415, there should be at least one total demand entity 410. To summarize, in the case of entity relationship diagram 400, there can be zero to many total demand function entities for each total demand entity, but and if there is at least one total demand function entity, there should be at least one total demand entity.

[0052] Returning now to the entities included in entity relationship diagram 400 of FIGURE 4, resource entity 435 can represent the network resources. Resource entity 435 can include a data set ID to associate resource entity 435 with the appropriate data set, a resource ID to identify a particular resource, a maximum capacity to represent the maximum accommodation for the resource, a maximum physical capacity to represent the actual physical capacity available for a resource and expected use capacity to represent the probable use for the resource. It should be noted that the maximum capacity might exceed the actual physical capacity of a resource. For instance, as most travelers have experienced, airlines often overbook flights by allowing for a maximum capacity on a plane that is greater than the actual physical capacity of the plane.

[0053] As will be recalled, resources can be grouped together into resource bundles. Resource bundles can be represented in entity relationship diagram 400 by resource bundle entity 445. Resource bundle entity 445 can include a data set ID to associate a resource bundle with an appropriate data set, a resource bundle ID to identify a particular resource and a unit cost to represent the cost associated with the consumption of a unit of the resource bundle. The association of resources with particular resource bundles can be represented by resource to bundle link entity 450. Resource to bundle link entity 450 can include a data set ID to associate the resource to bundle links with the appropriate data set, a resource ID to identify a particular resource and a resource bundle ID to identify a resource bundle to which a resource is associated. Resource to bundle link entity 450 can also include a weight to represent a resource's weight in relationship to other resources in the same data set. Essentially, in terms of entity relationship diagram 400, resource to bundle link entity 450 illustrates that one resource can be part of several bundles and one bundle can include several resources.

[0054] In addition to bundling resources into resource bundles, resource bundles can be bundled into larger bundles. This bundling of bundles can be represented by bundle to bundle link entity 453. Bundle to bundle link 453 can include a data set ID to identify the appropriate data set, a parent resource bundle ID to identify the bundle of resource bundles, a child resource bundle ID to identify a particular resource bundle and a weight to represent the relative weight of a particular bundle with respect to other resource bundles. The ability to bundle bundles can help facilitate certain optimization calculations, as would be understood by those of ordinary skill in the art.

[0055] The relationship between demands and resource bundles can be represented by resource bundle to demand link entity 455. Resource bundle to demand link entity 455 can include a data set ID to identify the appropriate data set, a resource bundle ID to identify a particular resource bundle and a total demand ID to identify the appropriate total demand to which a particular resource bundle can be associated. Additionally, resource bundle to demand link entity 455 can include an optimal quantity and optimal price. The optimal quantity can represent the optimal demand quantity that is served through the resource bundle identified by the resource bundle ID. The optimal price can represent the value to be charged for the total demand that maximizes the overall profit. Generally, the optimal quantity and optimal price can be added after a network optimization has been performed. For example, in the case of network 300 discussed in conjunction with Figure 3, the optimal price and optimal value would be added after a network optimization algorithm (e.g., demand to come LP algorithm) had been applied to generic revenue management data model 125. As would be understood by those of ordinary skill in the art, these values can facilitate the decomposition of network problems into local optimization problems.

[0056] The local demand or resource demand can be represented by resource demand entity 460. Resource demand entity 460 can include a data set ID to associate the resource demand with the appropriate data set, a resource ID to identify the resource to which a resource demand applies and a resource demand type to classify the demand type. Resource demand entity 460 can also include a maximum demand to represent the maximum quantity sought, a unit revenue to represent the revenue that can be realized for each unit of resource demand that is satisfied, an optimal quantity to represent the optimal resource demand quantity that is served by a resource and an optimal price to represent the value to be charged for the resource to maximize the overall profit.

[0057] As with total demand, the resource demand can depend upon a demand function and a demand time pattern. The resource demand function can be represented by resource demand function entity 465. Resource demand function entity 465 can include a data set ID to identify the appropriate data set, a resource ID to identify the appropriate resource to which the function applies, a resource demand type to identify the resource demand and a demand function type to identify the demand function. Similarly to a total demand function, a resource demand function can depend upon parameters. Each of these parameters can be represented